May 11, 2001

Mr. Michael C. Hughes
President
Bechtel Hanford, Inc.
3350 George Washington Way
Richland, Washington 99352

Dear Mr. Hughes:

This letter responds to your March 20, 2000, request for exemption from certain provisions contained in Title 10 of the Code of Federal Regulations, Part 835 (10 CFR 835), "Occupational Radiation Protection." Specifically, this response concerns your request for exemption from provisions contained in appendix D to 10 CFR 835 as they apply to removable surface contamination values for carbon-14 (C-14), nickel-63 (Ni-63), iron-55 (Fe-55), and plutonium-241 (Pu-241), which was later withdrawn. The purpose of the exemption request was to obtain relief from requirements associated with defining, controlling, and monitoring areas with contamination levels in excess of appendix D values.

The Office of Safety and Health conducted a technical review of the exemption request (enclosed). Discussions concerning the specifics of the exemption request were held with Department of Energy (DOE) and contractor personnel. Based on our review of the materials that were provided, the DOE is not granting an exemption from the 10 CFR 835, appendix D, values as they apply to C-14, Ni-63, and Fe-55. A significant element of the exemption request was to allow the site to avoid purchasing expensive monitoring equipment. DOE suggests the use of marker radionuclides be investigated as a solution for monitoring of hard to detect radionuclides.

The enclosed technical review provides additional information concerning the exemption decision.

The DOE Office of Environmental Management concurs with this exemption decision.

Sincerely,

Original signed by

Steven V. Cary
Acting Assistant Secretary
Office of Environment, Safety and Health

2 Enclosures

cc w/enclosures:
See attached list

cc w/enclosures:
Carolyn L. Huntoon, EM-1 (Acting)
John A. Gordon, NA-1
Keith Christopher, EH-10
Docketing Clerk, EH-3
Brenda Pangborn, Richland Operations
Office
Radiological Control
Coordinating Committee
Price Anderson Amendments
Act Coordinator

TECHNICAL REVIEW

Bechtel Hanford, Inc., Exemption Request for
Title 10 of the Code of Federal Regulations, Part 835 (10 CFR 835)

Bechtel Hanford Inc., (BHI) requests exemption from certain requirements of 10 CFR 835, "Occupational Radiation Protection." BHI requests relief from certain requirements from provisions contained in appendix D to 10 CFR 835 as they apply to surface contamination values for four radionuclides: carbon-14 (C-14), nickel-63 (Ni-63), iron-55 (Fe-55), and plutonium-241 (Pu-241). The purpose of the exemption request was to obtain relief from requirements associated with defining, posting, controlling, and monitoring areas with contamination levels in excess of appendix D values. The Office of Worker Protection Policy and Programs does not concur with this request for exemption.

Discussion

Background

On November 4, 1998, the Department of Energy (DOE) published an amendment to "Occupational Radiation Protection," 10 CFR 835, as a final rule in the Federal Register. The amended 10 CFR 835 includes Appendix D, "Surface Contamination Values."

BHI submitted their request for exemption on March 20, 2000. The DOE Richland Operations Office (RL) forwarded the exemption request to the Assistant Secretary, Office of Environment, Safety and Health, on April 28, 2000, recommending approval for C-14, Fe-55, and Ni-63. However, RL did not recommend approval of an exemption for Pu-241 because the daughter, americium-241, is an alpha emitter and is categorized as a transuranic radionuclide.

Request

BHI initially requested relief from the surface contamination values in 10 CFR 835, appendix D, as they apply to C-14, Ni-63, Fe-55, and Pu-241. RL subsequently notified EH that the request for Pu-241 had been withdrawn. The appendix D values are used for defining contamination and high contamination areas, determining the need for radioactive contamination control, monitoring, using protective clothing, and posting of contamination and high contamination areas. The values for C-14, Ni-63, and Fe-55 are presently determined by considering them to be members of the category, "Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above." The total (fixed plus removable) surface contamination limit is 5,000 disintegrations per minute (dpm) per 100 centimeters squared (cm^2). The removable surface contamination limit is 1,000 dpm/100cm^2.

BHI proposes to consider C-14, Ni-63, and Fe-55 as a separate class with a total activity value of 50,000 dpm/100 cm^2 and a removable activity value of 10,000 dpm/100 cm^2.

BHI also proposed adding a sentence to footnote 1 of appendix D: "However, for mixtures of beta-emitting isotopes the sum of the fractions rule will apply."

Requirements from which Exemption is Sought

Appendix D to 10 CFR 835, Surface Contamination Values in dpm/100cm^2

The data presented in appendix D are to be used in identifying and posting contamination and high contamination areas in accordance with 10 CFR 835.603(e) and (f) and identifying the need for surface contamination monitoring and control in accordance with 10 CFR 835.1101 and 1102.

Surface Contamination Values[1] in dpm/100 cm^2

Radionuclide	Removable [2,4]	Total (Fixed + Removable)[2,3]
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above[5]	1,000	5,000

Analysis

C-14 and Ni-63 are very low energy beta emitters and Fe-55 decays by electron capture resulting in emission of low energy x-rays. These radionuclides were produced by neutron activation in the Hanford production reactors and are now located throughout the facilities as a result of fuel change-out and maintenance activities. The exemption request states that because of the types and energies of radiation emitted by these radionuclides, in-field detection at the control levels established in appendix D to part 835 is very difficult. In addition, the efficiencies of survey instruments must be corrected for the mixture of interest. Use of new, and more costly, detectors can meet the criteria, but have very high operational costs and are not conducive to extensive field use. BHI states that to provide enough new instruments would require an additional expense of $75,000. The operational and maintenance costs for these new instruments would cost approximately $20,000 annually. Increased operational cost from radiological control technician time to release tools and equipment would add an additional $200,000 annually.

BHI states that the American National Standards Institute's (ANSI) 1999 standard, ANSI/ Health Physics Society (HPS) N13.12, "Surface and Volume Radioactivity Standards for Clearance," lists C-14, Ni-63, and Fe-55 in a group designated "Other Beta-gamma emitters" with a total surface screening level of 600,000 dpm/100 cm^2. The ANSI/HPS standard is based on a 1 millirem total effective dose equivalent criterion to an average member of a critical group of the public. BHI proposes to set the total activity level at 50,000 dpm/100cm^2 and the removable level at 10,000 dpm/100cm^2 based on the ratio of total to removable in appendix D of 10 CFR 835.

BHI states that because of the types and energies of radiation emitted by these radionuclides, detection at the control levels established in appendix D to part 835 is very difficult. Use of new, and more costly, detectors can meet the criteria but have very high operational costs and are not conducive to extensive field use. DOE agrees that the radionuclides listed in the exemption request require special consideration when developing survey and monitoring protocols. Section 4.4.2 of DOE Guide (G) 441.1-9, "Radioactive Contamination Control Guide," dated June 17, 1999, states that:

> "10 CFR 835.401(b) requires that instruments and equipment used for monitoring be appropriate for the types, levels, and energies of the radiation(s) encountered. The effectiveness of the contamination monitoring techniques discussed in this section may be limited due to the physical conditions and specific characteristics (chemical and radiological) of radionuclides present in some DOE facilities. For example, common frisking and smear counting techniques and instruments may not be effective in detecting certain low-energy radiations. Detailed technical guidance for performing monitoring under these conditions is outside the scope of this Guide. Monitoring under these conditions should be conducted in accordance with applicable DOE Technical Standards and other documents, including those referenced in Section 3 of this Guide."

DOE does not agree that the only approach to monitoring for these radionuclides is use of costly new instrumentation. It has been found at other DOE facilities that it is possible to use other more easily measured radionuclides as markers for hard to detect radionuclides. It is necessary to perform characterization studies first to identify the radionuclides present and then to quantify the amounts present and their numerical relationship to each other. This ratio can be used to convert the activity of the marker to the activity of the unknown. DOE has not been provided with any information showing that this approach would not work at BHI facilities.

With regard to the request to add a sentence regarding summing the fractions for mixtures of radionuclides to footnote 1 of appendix D, DOE has provided guidance for evaluating mixtures of radionuclides in section 4.4.1 of DOE G 441.1-9:

> "If a surface is contaminated with radionuclides all of which fall within the same 10 CFR 835 Appendix D category, then the contamination levels of the various radionuclides should be summed to determine if contamination levels in any area monitored exceeds the applicable Appendix D value. For example, if a surface is contaminated with both U-235 and U-238, then the contamination levels of both radionuclides should be summed to determine whether or not the applicable Appendix D value has been exceeded.
>
> If a surface is contaminated with a combination of radionuclides in different 10 CFR 835 Appendix D categories, then the values provided in Appendix D of 10 CFR 835 may be considered to be independent of one another. It is not necessary to perform a sum of the fractions calculation to determine if the contamination levels in any area monitored exceed the applicable Appendix D value."

DOE has provided guidance that states that the approach for summing fractions for mixtures of radionuclides, as requested in the exemption request, is acceptable. Accordingly, the Office of Worker Protection Policy and Programs recommends that the BHI request to add a sentence to footnote 1 of appendix D be denied because it is not needed.

In addition, if granted, the exemption decision will allow the release of material from radiological areas to controlled areas using release criteria for C-14, Fe-55, and Ni-63 that are greater than those allowed for unrestricted releases in DOE Order (O) 5400.5. The exemption request does not specify how the site will identify and control the unrestricted release of these materials from the site. DOE has placed a moratorium on the release of volumetrically contaminated metals and a suspension on surface-contaminated metals intended for recycling from radiation areas. As a result of this moratorium, DOE is proposing to increase its requirements for the unrestricted release of all contaminated or potentially contaminated property.

Conclusions

10 CFR 820.62(d) requires that exemption requests meet at least one of six special circumstances in order to be approved. It is the Office of Worker Protection Policy and Programs' position that BHI has not successfully demonstrated that this exemption request meets any special circumstance, including "that application of the requirement in the particular circumstances would not serve or is not necessary to achieve its underlying purpose, or would result in resource impacts which are not justified by the safety improvements." BHI has not demonstrated that they cannot use alternate monitoring methods such as use of scaling factors based on easier to detect radionuclides. DOE has provided guidance that states that the approach of summing fractions for mixtures of radionuclides is acceptable. The Office of Worker Protection Policy and Programs concludes that an exemption to allow this approach is not needed. Therefore, BHI's request to add the sentence to footnote 1 of appendix D should be denied.

In addition, BHI has not addressed the impact of having different release criteria for releasing material to controlled areas (10 CFR 835) and releasing material to uncontrolled areas (DOE O 5400.5).

Accordingly, the exemption request should not be granted because the exemption request does not fulfill any special circumstance.

Concurrence

Consistent with the technical position provided above, the Office of Worker Protection Policy and Programs does not concur with the BHI exemption request.

Duration of Exemption

Not Applicable

EXEMPTION DECISION

Pursuant to title 10 of the Code of Federal Regulations, part 820.61 (10 CFR 820.61), the Assistant Secretary for Environment, Safety and Health (EH-1) is authorized to exercise authority on behalf of the Department of Energy (DOE) with respect to requests for exemptions from nuclear safety rules relating to radiological protection of workers, the public, and the environment.

On March 20, 2000, Bechtel Hanford, Inc., (BHI) filed a request with the Department for permanent exemption from certain requirements of Title 10 of the Code of Federal Regulations, Part 835 (10 CFR 835), "Occupational Radiation Protection."

In particular, BHI requested relief from certain values specified in 10 CFR 835, appendix D--specifically, the values that apply to surface contamination by carbon-14, nickel-63, iron-55, and plutonium-241. (Subsequently, the exemption request was modified so that plutonium-241 was no longer included.) These values are used for defining contamination and high contamination areas and determining the need for radioactive contamination control, monitoring, using protective clothing, and posting of contamination and high contamination areas. DOE suggests that the use of marker radionuclides be investigated as a solution for monitoring of hard to detect radionuclides such as carbon-14, nickel-63, and iron-55.

The request states that the exemption is not prohibited by law; will not present an undue risk to the public health and safety, the environment, or facility workers; and is consistent with the safe operation of a DOE nuclear facility.

Under the terms set forth in 10 CFR 820.61, I am the Secretarial Officer granted review and approval authority for exemption requests made with respect to 10 CFR 835. Based on a review of the supporting documentation, I find that the request set forth above has not been justified for relief from appendix D of 10 CFR 835. Specifically, I find that the exemption criteria of 10 CFR 820.62 have not been met. I have determined that the exemption does not meet the special circumstances, described in the technical position prepared by the Office of Worker Protection Policy and Programs, that constitute a sufficient basis upon which to grant this exemption.

On the basis of the foregoing, I hereby disapprove BHI's request for exemption from the stated section of 10 CFR 835.

Pursuant to 10 CFR 820.66, BHI has 15 days from the date of the filing of this decision to file a Request to Review with the Secretary. The Request to Review shall state, specifically, the respects in which the exemption determination is claimed to be erroneous, the grounds of the request, and the relief requested. If no Request to Review is submitted, the exemption decision becomes a final order 15 days after it is filed.

May 11, 2001
Date

Original signed by
Steven V. Cary
Acting Assistant Secretary
Office of Environment, Safety and Health